

METHOD OF OPERATION  
TRUNK CIRCUIT

Keys For Listening And Holding - Relays On Relay Rack - Machine Switching System -  
REPAIR CLERK'S DESK #1.

GENERAL DESCRIPTION

1. These circuits are one and two way trunk circuits between repair clerk's desk, and, zero operator's position at the local switchboard, final selector and line switch, district or office multiple, and test desk.
2. Figures 1 and 5 show a circuit which is used to provide trunking facilities between the zero operator's position at the switchboard and the repair clerk's desk. The other end of this circuit terminates in a jack and is used with cord circuits whose sleeves are grounded through a maximum resistance of 231 ohms.
3. Figures 2 and 4 show a ringdown trunk incoming from the final selector and outgoing to a line switch.
4. Figures 3 and 7 show a circuit which is used to provide non-charge trunk facilities from subscribers' lines through the district or office selectors to the repair clerk's desk. It is arranged for incoming service only.
5. Figures 3 and 6 show a circuit which is used between the repair clerk's desk and the test desk. The other end may be identical.

DETAILED DESCRIPTION

OPERATION

INCOMING FROM AND OUTGOING TO LOCAL SWITCHBOARD, FIGURES #1 AND #5.

6. When the plug of a cord is inserted in the jack at the switchboard, battery is connected to the lead S, thus closing a circuit to operate the E380 relay in series with the auxiliary signal circuit. The E380 relay operated, causes the trunk lamps to flash from battery through the interrupter over lead A, break contact of the E540 relay to ground through the trunk lamps.
7. When the call is answered by the trunk key being operated to the talking position, ground on lead S1 is connected through the winding of the E370 relay operating it. The E370 relay operated, in turn operates the E540 relay and connects battery and ground through the #54-D retardation coil, to the tip and ring of the trunk extinguishing the supervisory lamp in the cord circuit. The E540 relay operated functions as follows: (a) Locks to ground on the S lead and is thus held operated until both operators disconnect. (b) Disconnects the E380 relay and the auxiliary signal circuit. (c) Supplants interrupted battery by steady battery, thus keeping the trunk lamps lighted as busy signals.



DISCONNECT:

8. When the trunk key is restored to normal, the E370 relay releases, disconnecting battery and ground from the tip and ring of the trunk, re-lighting the supervisory lamp in the cord circuit as a disconnect signal. When the plug of the cord is removed from the jack at the switchboard, battery is disconnected from the lead S, thus allowing the E540 relay to release. The release of the E540 relay extinguishes the trunk lamp, restoring the circuit to normal.

OUTGOING CALLS:

9. When the trunk key is operated to the talking position, ground is connected to the lead S1 operating the E370 relay. The E370 relay operated, in turn operates the E540 relay. The E540 relay operated connects battery through its winding to the lead S lighting the trunk lamp at the distant end. In this case supervision is effected by the bridged resistance in the telephone circuit.

DISCONNECT.

10. When the trunk key is restored to normal, the bridge in the telephone circuit is removed from across the tip and ring of the cord, thus allowing the supervisory lamp in the distant cord circuit to light as a disconnect signal. When the plug of the cord is removed from the jack at the distant end, the E540 relay releases, restoring the circuit to normal, as previously described.

11. When the trunk key is operated to the holding position, the #18-AE resistance bridged across the trunk prevents the distant cord supervisory lamp from lighting thereby holding the trunk. The E370 relay is held operated performing the same function as before.

INCOMING FROM FINAL SENDER OR OUTGOING TO LINE SWITCH. FIGURES 2 AND 4.

INCOMING CALLS

12. On an incoming call from a final selector the mechanical apparatus seizes this trunk, connecting battery to the lead S, operating the B139 relay. The B139 relay operates, closes in part, a locking circuit through the 425 ohm winding of the E633 relay. When ringing current is applied to the tip and ring of the trunk, the B136 relay operates through its 550 ohm winding and locks through its 475 ohm winding, under control of the E633 relay. The circuit in which the B136 relay locks, is traced to ground over lead B in series with a relay in the auxiliary signal circuit (not shown) which when operated connects the interrupter circuit to lead A. The B136 relay operated, closes a circuit from battery, through interrupter (not shown) over lead A, through the make contact of the B136 relay, break contact of the E633 relay, through the trunk lamps, causing the lamps to flash until the call is answered.

13. When the call is answered by the operation of the trunk key to the talking position, the ringing current is tripped by the bridge in the telephone circuit and the E633 relay operates from battery through its inner winding, break contact of the holding side of the trunk key, make contact of the talking side of the key,



to ground over lead S-2. The E633 relay operated, (a) Locks through its 425 ohm winding under control of the B139 relay. (b) Opens the locking circuit for the B136 relay which releases. (c) Disconnects the 550 ohm winding of the B136 relay from across the trunk. (d) Supplants the interrupted battery with steady battery, thus causing the lamps to remain lighted as a busy signal.

14. The operation of the trunk key to the talking position connects a bridge in the talking circuit (not shown) across the tip and ring of the trunk, causing the mechanical apparatus to function.

15. When the trunk key is operated to the holding position the 550 ohm winding of the B136 relay is connected across the tip and ring of the trunk as a holding bridge.

#### DISCONNECT

16. When the trunk key is restored to normal, the bridge is removed from the tip and ring of the trunk and when the final selector disconnects from this trunk, the B139 relay releases, in turn releasing the E633 relay, restoring the circuit to normal.

#### OUTGOING CALLS.

17. When the trunk key is operated to the talking position on an outgoing call, the bridge in the telephone circuit operates the line relay and starts a switch hunting for an idle district circuit. The E633 relay operates lighting the trunk lamps as a busy signal and disconnects the 550 ohm winding of the B136 relay from across the trunk. When the line switch moves off normal and finds an idle district circuit, the B139 relay operates in turn locking the E633 relay.

#### DISCONNECT.

18. When the trunk key is restored to normal, the bridge is removed from the tip and ring of the trunk, thus causing the mechanical apparatus to return to normal, releasing the B139 relay. The B139 relay released, releases the E633 relay, restoring the circuit to normal.

#### INCOMING FROM DISTRICT OR OFFICE MULTIPLE OR TEST DESK: FIGURES 3 AND 7.

19. When this trunk is selected, the E226 relay is operated in a circuit from battery, through the relay, over the tip side of the trunk, through the polarized relay bridge (not shown), to the district, back over the ring side of the trunk, break contact of the E584 relay, over lead (c) through a relay in the auxiliary signal (not shown) to ground. The E226 relay operated, the line lamps at the receiver's desk flash in a circuit from ground through the lamps, break contact of the E584 relay, make contact of the E226 relay, over lead "A" to battery through the contacts of the interrupter relay, in the auxiliary signal and transfer circuits. A ringing tone is connected back over the tip through the .02 M.F. condenser. When the call is answered, the operation of the talking key associated with



the lighted line lamp, operates the E584 relay in a circuit from ground over lead S<sub>2</sub>. The E584 relay operated locks to ground over lead S to the district circuit, releases the E226 relay, and supplants steady battery to the trunk lamps thus causing them to remain lighted, as a busy signal.

#### DISCONNECT

20. When ground is removed from lead "S" at the district, the E584 relay is released, extinguishing the busy lamps and restoring the circuit to normal.

21. These trunks are arranged to transfer to a switchboard operator, when the repair clerk's desk is unattended.

#### INCOMING FROM AND OUTGOING TO TEST DESK. FIGURES 3 AND 6.

22. When there is an incoming call from the test desk, the E380 relay operates from battery over lead S, break contact of the E540 relay, winding of the E380 relay to ground in the auxiliary signal circuit. The E380 relay operated, closes a circuit from battery through the interrupter (not shown) over lead A, through make contact of the E380 relay, break contact of the E540 relay to ground through the trunk lamps, causing the lamps to flash until the call is answered.

23. When the call is answered by the trunk key being operated to the talking position, the E540 relay operates from battery through both windings in series through key contacts to ground over lead S<sub>2</sub>. The E540 relay operated, locks to ground on lead S until the connection is released at both ends, supplants steady battery to the trunk lamps causing them to remain lighted as a busy signal, and opens the circuit through the E380 relay releasing it.

#### OUTGOING CALLS.

24. When the trunk key is operated to the talking position, on an outgoing call, ground is connected from the telephone circuit over lead S<sub>2</sub>, through the non-inductive and inductive windings of the E540 relay in series. The E540 relay operates and closes a circuit to light the trunk lamps as a busy signal and connects battery to lead S to light the trunk lamp at the distant end. The E380 relay does not operate on outgoing calls.

#### DISCONNECT.

25. When the keys at both ends of the trunk are releases, the E540 relay releases, extinguishing the trunk lamps, and restoring the circuit to normal.



CIRCUIT REQUIREMENTS

	<u>OPERATE</u>	<u>NON-OPERATE</u>	<u>RELEASE</u>
B136 In- wdg. 500 ohms.	Test .013 amp. Readj. .012 amp.		Test .0042 amp. Readj. .0045 amp.
Outer Wdg. 475 ohms.	Test .020 amp.		
B139	Test .0009 amp. Readj. .0007 amp.		Test .0002 amp. Readj. .0002 amp.
E226	Test .016 amp. Readj. .015 amp.		Test .0038 amp. Readj. .004 amp.
E380	Test .0095 amp. Readj. .009 amp.		Test .0009 amp. Readj. .001 amp.
E370	Test .028 amp. Readj. .018 amp.		Test .0028 amp. Readj. .003 amp.
E540 In- ner Wdg. 500 ohms	Test .018 amp. Readj. .017 amp.	Test .010 amp. Readj. .011 amp.	
E584	Test .031 amp. Readj. .020 amp.	Test .010 amp. Readj. .011 amp.	
E633 Inner Wdg.	Test .027 amp. Readj. .022 amp.	Test .013 amp. Readj. .014 amp.	
Outer Wdg.	Test .036 amp.		

ENG.--PTH-RV.  
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CHK'D.--CHW.

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